

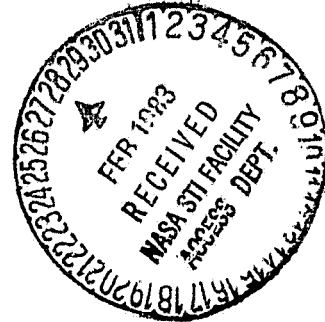
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MATERIALS PROCESSING IN SPACE BIBLIOGRAPHY -
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Compiled by Elizabeth Pentecost
Space Science Laboratory, Science & Engineering Directorate

January 1983

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*George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama*

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16. ABSTRACT <p>This edition of the Materials Processing in Space (MPS) Bibliography is a compilation of Government reports, contractor reports, conference proceedings, and journal articles dealing with flight experiments utilizing a low-gravity environment to elucidate and control various processes or with ground-based activities that provide supporting research. It encompasses literature published but not cited in the first bibliography and that literature which has been published in the past year. Subdivisions of the bibliography include six major categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes; Glasses and Ceramics; Ultrahigh Vacuum and Containerless Processing Technologies; Combustion, in addition to a list of patents and appendices providing a compilation of anonymously authored collections and reports and a cross reference index.</p>					
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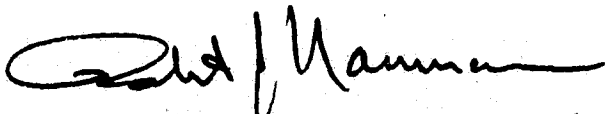
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PREFACE

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All papers referenced are on file in the Space Processing Division at Marshall Space Flight Center. Copies can be made available to workers in the field upon request to the bibliographer.

Any omissions that might have occurred are sincerely regretted. Investigators are encouraged to submit information on any work that was inadvertently omitted or any new work to the bibliographer for inclusion in next year's edition of the bibliography. All correspondence concerning corrections, additions, or deletions to the Materials Processing in Space Bibliography should be directed to:
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Chief Scientist
Materials Processing in Space Program

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1. MATERIALS PROCESSING IN SPACE PROGRAM

A. U.S. PROGRAM

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Crystal Growth

Anderson, E. E., Kroes, R. L., and Reiss, D., "Triglycine Sulfate Crystal Growth Rate Determination," Bull. Am. Phys. Soc. 27, 21 (January 1982).

Bourret, E. D., Favier, J. J., and Witt, A. F., "Segregation During Directional Melting and Its Implications on Seeded Crystal Growth: A Theoretical Analysis," J. Crystal Growth (1982), in press.

Bourret, E. D. and Witt, A. F., "Theoretical Analysis of Discretional Melting," Proceedings of ECVGE-5/Accg-5, Coronado, CA, July 19-24, 1981.

Bourret, E. D. and Witt, A. F., "Seeded Crystal Growth of Pseudobinary Systems with Large Liquidus-Solidus Separation," Ceramic Bulletin (March 1982); presented at ACS Annual Meeting, Cincinnati, Ohio, May 2-5, 1982.

Brown, R. A., "Natural Convection in Melt Crystal Growth: The Influence of Flow Pattern on Solute Segregation," presented at National Congress on Theoretical and Applied Mechanics, June 1982.

Chen, P-S., Wilcox, W. R., and Shlichta, P. J., "Free Convection About a Rectangular Prismatic Crystal Growing from a Solution," Int. J. Heat & Mass Transfer 22, 1669-1679 (1979).

Clayton, J. C., "Analysis of Directional Solidification Space Processing Experiments," Semtec, Annual Report, NAS8-33746, February 1982..

Clayton, J. C., "Transient and Diffusion Analysis of HgCdTe," NASA CR-162049, July 1982.

Clayton, J. C., Davidson, M. C., Gillies, D. C., and Lehoczky, S. L., "One Dimensional Analysis of Segregation in Directionally Solidified HgCdTe," Journal of Crystal Growth (submitted).

Coriell, S. R., Cordes, M. R., and Boettinger, W. J., and Sekerka, R. F., "Effect of Gravity on Coupled Convective and Interfacial Instabilities During Directional Solidification," Adv. Space Res. 1 (5), 5-11 (1981).

Cothran, E., "An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth: One-Dimensional Analysis, Computer Program Users Manual," NASA TM-82487, May 1982.

Ettouney, H. M. and Brown, R. A., "Effect of Heat Transfer on Melt/Solid Interface Shape and Solute Segregation in Edge-Defined Film-Fed Growth: Finite Element Analysis," J. Cryst. Growth 58, 313-329 (1982).

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Fu, T. W., Wilcox, W. R., and Larson, D. J., "Rate Change Transients in Bridgman-Stockbarger Growth of MnBi-Bi Eutectic," J. Cryst. Growth 57, 189-193 (1982).

Gatos, H. C., "Semiconductor Crystal Growth and Segregation Problems on Earth and in Space," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 355-372.

Ghias, I. and Wilcox, W. R., "Numerical Analysis of the Influence of Convection on Off-Eutectic Solidification," Met. Trans. B 12B, 249 (June 1981).

Gillies, D. C. and Clayton, J. C., "Indirect Determination of the Interface in Solid Solution Crystals," Journal of Crystal Growth (submitted).

Harriott, G. M. and Brown, R. A., "Mass Transfer Driven by Rotation in Small-Scale Floating Zones," in preparation for J. Crystal Growth (1982).

Holland, L. R., "Space Processing of Electronic Materials," Final Report, NAS8-34432, September 28, 1982.

Holland, L. R., "Radiant Heating of Ampoule Contents," NASA Tech Briefs, Fall/Winter 1981, p. 349.

Jasinski, T. J., Rohsenow, W. M., and Witt, A. F., "Heat Transfer Analysis of the Bridgman-Stockbarger Configuration for Crystal Growth. Part I: Analytical Treatment of the Axial Temperature Distribution," submitted to J. Crystal Growth (1982).

Jasinski, T. J., Rohsenow, W. M., and Witt, A. F., "Heat Transfer Analysis of the Bridgman-Stockbarger Configuration for Crystal Growth. Part II: Analytical Treatment of the Radial Temperature Distribution," submitted to Journal of Crystal Growth (1982).

Jasinski, T. J., Rohsenow, W. M., and Witt, A. F., "On the Effects of Heat Transfer During Vertical Bridgman Growth of CdTe and HgCdTe," presented at final program review of HgCdTe Processing and Characterization Research, Bloomington, MN, October 1981, p. viii-1.

Jhaveri, B. S. and Rosenberger, F., "Exact Triple Integrals of Beam Functions," J. Compt. Phys. 45, 300-302 (1982).

Jhaveri, B. S. and Rosenberger, F., "Expansive Convection in Vapor Transport Across Horizontal Rectangular Enclosure," J. Cryst. Growth 57, 57-64 (1982).

Jhaveri, B. S., Markham, B. L., and Rosenberger, F., "On Singular Boundary Conditions in Mass Transfer Across Rectangular Enclosures," Chem Engr. Commun. 13, 65-75 (1981).

Kamieniecki, E., Lagowski, J., and Gatos, H. C., "Wavelength-Modulated Photocapacitance Spectroscopy," J. Appl. Phys. 51, 1863-1865 (March 1980).

Kelley, J. D., Martin, B. G., Szofran, F. R., and Lehoczky, S. L., "Application of the Regular Associated Solution Model to the Cd-Te and Hg-Te Binary Solutions," J. Electrochem. Soc. 129, 2360 (October 1982).

Kern, E. L., "Increased Uniformity of Silicon Needed for Critical Devices. How Can We Improve the Float Zone Process?" in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 445-448.

Kern, E. L. and Cothran, E. K. (eds.), "Float Zone Workshop," Proceedings of a Working Group Meeting held at MSFC, AL, September 1981, NASA CP 2226.

Kern, E. L. and Gill, G. L., "Breadboard Float Zone Experiment System for High Purity Silicon," Final Report, NAS8-34542, June 1982.

Kroes, R. L., "Mapping Crystal Defects with a Scanning Ultramicroscope," Bull. Am. Phys. Soc. 26, 1203 (November 1981).

Kroes, R. L., "Triglycine Sulfate Crystal Growth Rate Determination," Bull. Am. Phys. Soc. 27, 21 (January 1982).

Kroes, R. L. and Reiss, D., "The Pyroelectric Properties of TGS for Application in Infrared Detection," NASA TM-82394, January 1981.

Lal, R. B., Kroes, R. L., and Wilcox, W. R., "Growth of Triglycine Sulfate (TGS) Crystals by Solution Technique," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 399-408.

Lal, R. B. and Kroes, R. L., "Growth of Crystals by Solution Technique Aboard Spacelab III," J. Electrochem. Soc. 127, 137c (1980).

Lal, R. B. and Kroes, R. L., "Liquid Phase Epitaxy (LEP) of GaAs in Low Gravity," J. Electrochem. Soc. 127, 137c (1980).

Lehoczky, S. L. and Szofran, F. R., "Directional Solidification and Characterization of $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 409-420.

Lehoczky, S. L., Szofran, F. R., Summers, C. J., and Martin, B. G., "Electrical Characterization of $Hg_{1-x}Cd_xTe$ Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 421-432.

Liu, L. C., Wilcox, W. R., Kroes, R. L., and Lal, R. B., "Modelling of TGS Growth in Space," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 389-397.

Markham, B. L. and Rosenberger, F., "Velocity and Concentration Distribution in a Stefan Diffusion Tube," Chem. Engr. Commun. 5, 287-298 (1980).

Naumann, R. J., "An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth I. One-Dimensional Analysis," J. Cryst. Growth 58, 554-568 (1982).

Naumann, R. J., "An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth II. Two-Dimensional Analysis," J. Cryst. Growth 58, 569-584 (1982).

Naumann, R. J., "Effect of Variable Thermal Conductivity on Isotherms in Bridgman Growth," Journal of Crystal Growth (submitted).

Okamoto, A., Isozumi, S., Lagowski, J., and Gatos, H. C., "In Situ Monitoring of Liquid Phase Electroepitaxial Growth," J. Electrochem. Soc. 129, 2095 (September 1982).

Pimputkar, S. M. and Ostrach, S., "Convective Effects in Crystal Grown from Melt," J. Cryst. Growth 55, 614-646 (1981).

Rosenberger, F., "Fluid Dynamic Effects in Vapor Crystal Growth Ampoules," in Preparation and Characterization of Materials, J. M. Honig and C.N.R. Rao, eds., Academic Press, New York, 1981, pp. 3-27.

Rosenberger, F., "Crystal Growth Kinetics," in Interfacial Aspects of Phase Transformations (B. Mutaftschiev, ed.), Reidel Publishing, 1982, pp. 315-364.

Rosenberger, F., "Mass Transfer in Closed Ampoule Vapor Crystal Growth," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 199-201.

Rosenberger, F., "Convection in Vapor Crystal Growth Ampoules," in Convective Transport and Instability Phenomena (J. Zierep and H. Oertel, eds.), Verlag-Braun, 1982, pp. 469-489.

Sigai, A. G. and Wiedemeier, H., "Solid-Gas Phase Equilibria and Thermodynamic Properties of Cadmium Selenide," J. Electrochem. Soc. **119**, 910-914 (July 1972).

Sigai, A. G. and Wiedemeier, H., "The Sublimation and High-Temperature Thermodynamic Properties of Solid Solutions of MnSe and CdSe ," J. Chem. Thermodynam. **6**, 983-991 (1974).

Springer, J. M., Silberman, E., and Kroes, R. L., "Mapping Crystal Defects With a Scanning Ultramicroscope," Bull. Am. Phys. Soc. **26**, 1203 (November 1981).

Szofran, F. R. and Lehoczky, S. L., "Liquidus Temperatures of Hg-Rich Hg-Cd-Te Alloys," Journal of Electronic Materials (submitted).

Szofran, F. R. and Lehoczky, S. L., "The Pseudobinary HgTe-CdTe Phase Diagram," J. Elect. Mat. **10**, 1131 (1981).

Thompson, C. V. and Spaepen, F., "The Effect of Solute on the Homogeneous Crystal Nucleation Frequency in Metallic Melts," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North-Holland, 1982, pp. 603-610.

Tiller, W. A., Feigelson, R. S., and Elwell, D., "Direct Observation of Interface Instability During Crystal Growth," Final Report, NAS8-33310, February 1982.

Ungar, L. H., Ettouney, H. M. and Brown, R. A., "The Effect of Grain Boundaries on the Morphological Stability of Crystals Grown from the Melt," in preparation for Acta Met. (1982).

Van den Berg, L. and Schnepple, W. F., "Growth of Single Crystals of Mercuric Iodide (HgI_2) in Spacelab III," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 439-444.

Vydyanath, H. R., "Point Defects in Doped and Undoped $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 437-438.

Vydyanath, H. R., "Defect Chemistry and Characterization of $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ Technical Report, December 18, 1978-February 17, 1982, NAS8-33245.

Vydyanath, H. R., "Lattice Defects in Semiconducting $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ Alloys, II-Defect Structure of Indium Doped $\text{Hg}_{0.8}\text{Cd}_{0.2}\text{Te}$," J. Electrochem. Soc. **128**, 2619 (1981).

Vydyanath, H. R., Donovan, J. C., and Nelson, D. A., "Lattice Defects in Semiconducting $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$, III-Defect Structure of Undoped $\text{Hg}_{0.8}\text{Cd}_{0.2}\text{Te}$," J. Electrochem. Soc. **128**, 2525 (1981).

Vydyanath, H. R., "Defect Chemistry and Characterization of $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ " NASA CR-162005, February 1982, 102 pgs.

Vydyanath, H. R. and Kroger, F. A., "Doping Behavior of Iodine in $\text{Hg}_{0.8}\text{Cd}_{0.2}\text{Te}$," J. Electro. Mat. 11, 111-131 (1982).

Walukiewicz, W., Lagowski, J., and Gatos, H. C., "Electron Mobility of n-Type GaAs at 77 K; Determination of the Compensation," J. Appl. Phys. 53, 769-770 (1982).

Wang, C. A., Carruthers, J. R., and Witt, A. F., "Analysis of Crystal Growth and Segregation in Vertical Bridgman Configuration," in Proceedings of Fifth International Conference on Vapor Growth and Epitaxy/American Conference on Crystal Growth, Coronado, CA, July 1981.

Wang, C. A., Carruthers, J. R., and Witt, A. F., "End-Effects on Crystal Growth and Segregation Behavior in Vertical Bridgman Configuration," in preparation for J. Crystal Growth (1982).

Wang, C. A., Carruthers, J. R., and Witt, A. F., "Growth Rate Dependence of the Interface Distribution Coefficient in the System Ge-Ga," in preparation for J. Crystal Growth (1982).

Wiedemeier, H. and von Schnering, H. G., "Refinement of the Structures of GeSe, GeSe, SnSe and SnSe," Z. f. Kristallog. 148, 295-303 (1978).

Wiedemeier, H. and Csillag, F. J., "Equilibrium Sublimation and Thermodynamic Properties of SnS," Thermochim. Acta 34, 257-265 (1979).

Wiedemeier, H. and Chandra, D., "Chemical Vapor Transport, Crystal Growth, Thermodynamic and Fluid Dynamic Analysis of the $\text{Hg}_{1-x}\text{Cd}_x\text{Te}$ System," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 433-436.

Wiedemeier, H. and Chandra, D., "Chemical Vapor Transport and Crystal Growth of the $\text{Hg}_{0.8}\text{Cd}_{0.2}\text{Te}$ System, Crystal Morphology and Homogeneity," Z. Anorg. Allg. Chem. 488, 137 (1982).

Wilcox, W. R., Doddi, K., Nair, M., and Larson, D. J., "Influence of Freezing Rate Changes on MnBi-Bi Eutectic Microstructures," to be published in Proceedings of XXIV COSPAR Plenary Meeting, Ottawa, Canada, May-June 1982.

Witt, A. F., "The Direct and Indirect Impact of Space Experiments on Electronic Materials Processing Technology," Ceramic Bulletin (March 1982), presented at ACS Annual Meeting, Cincinnati, OH, May 2-5, 1982.

Zoutendyk, J. A. and Akutagawa, W. M., "Gravity-Driven Convection Studies in Compound Semiconductor Crystal Growth by Physical Vapor Transport," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 449-458.

Metals, Alloys, and Composites

Abbaschian, G. J. and Flemings, M. C., "Levitation and Supercooling of Fe-25% Ni Alloys," submitted to Met. Trans. (1982).

Bevolo, A. J., Verhoeven, J. D., and Noack, M., "Electron Loss Study of the Native Oxide of Tin," J. Vac. Sci. Techn 20, 943-945 (April 1982).

Carlson, F. M., Chin, L-Y., Fripp, A. J., and Crouch, R. K., "Finite Element Analysis of the Effect of a Non-Planar Solid-Liquid Interface on the Lateral Solute Segregation During Unidirectional Solidification," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 629-638.

Coriell, S. R., Cordes, M. R., and Boettinger, W. J., and Sekerka, R. F., "Effect of Gravity on Coupled Convective and Interfacial Instabilities during Directional Solidification," Adv. Space Res. 1 (5), 5-11 (1981).

Crouch, R. K., Fripp, A. J., Debnam, W. J., Clark, I. O., and Carlson, R. M., "Ground Based Studies for the Space Processing of Lead-Tin-Telluride," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 611-618.

Crouch, R. K., Fripp, A. L., Debnam, W. J., Taylor, R. E., and Groot, H., "Thermophysical Properties of Germanium for Thermal Analysis of Growth from the Melt," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 657-664.

Elias, E. and Eagar, T. W., "Signal Analysis of Voltage Noise in Welding Arcs," Proceedings of ASM Conference on Welding Consumables and Process Developments, Peoria, IL, September 1981, in press.

Evans, N. A., Hofmeister, W. H., Bayuzick, R. J., Robinson, M. B., and Rathz, T. J., "Effects of Undercooling on the Microstructure of Niobium-Germanium and Niobium-Aluminum Alloys," presented at NATO Conference, Sicily, August 1982.

Evans, N. A., Hofmeister, W. H., Bayuzick, R. J., Robinson, M. B., and Rathz, T. J., "Effects of Undercooling on the Microstructure of Niobium-Germanium and Niobium-Aluminum Alloys," presented at Materials Research Society Meeting, Boston, MA, November 1-5, 1982.

Favler, J. J., "Striations of Kinetic Origin Induced During Non-Steady State Solidification," J. Electrochem. Soc. 129, 2355 (October 1982).

ORIGINAL PAGE IS
OF POOR QUALITY

Fine, J., Hardy, S. C., and Andreadis, T. D., "Summary Abstract: Ion Bombardment Cleaning of Liquid Gallium Surfaces," J. Vac. Sci. Tech. 18, 1310-1311 (April 1981).

Flemings, M. C., "Segregation and Structure in Rapidly Solidified Cast Metals," in Metallurgical Treatises (J. K. Tien and J. F. Elliot, eds), Metallurgical Society of AIME, 1981, pp. 291-300.

Glicksman, M. E., Sing, N. B., and Chopra, M., "Influence of Diffusion and Convective Transport on Dendritic Growth in Dilute Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 461-478.

Glicksman, M. E. and Huang, S. C., "Convective Heat Transfer During Dendritic Growth," in Convective Transport and Instability Phenomena, Chapter 3 (Zierep and Oertels, eds.), G. Braun Publishing Co., 1982, pp. 557-574.

Grant, N. J., "Powder and Particulate Production of Metallic Alloys," Proceedings of Joint ASM/AIME Conference on Powder Metallurgy (1982), in press.

Grant, N. J., "Rapid Solidification of Metallic Particulates," in Aluminum Powder Metallurgy (AIME, 1982), in press.

Grugel, R. N., Lograsso, T. A., and Hellawell, A., "Directional Solidification of Alloys in Systems Containing a Liquid Miscibility Gap," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 553-562.

Grugel, R. N. and Hellawell, A., "The Occurrence of Aligned Microstructures in Directionally Solidified Aluminum-Bismuth Alloys," Met. Trans. 13A, 493-495 (March 1982).

Hardy, S. C. and Fine, J., "Studies of Liquid Metal Surfaces Using Auger Spectroscopy," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 503-511.

Johnston, M. H. and Parr, R. A., "Low Gravity Solidification Structures in the Tin-15 WT% Lead and Tin-3 WT% Bismuth Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 651-656.

Kaukler, W. F. and Rutter, J. W., "Quantitative Evaluation of the Interfacial Free Energies at a Solid-Liquid Lamellar Eutectic Interface," to be published in Proceedings of Materials Research Society, Conference on In-Situ Composites-IV, Boston, MA, November 1981.

Lacy, L. L., Rathz, T. J., and Robinson, M. B., "Containerless Undercooling and Solidification of Bulk Metastable Nb₃Ge Alloys," J. Appl. Phys. 53, 682 (January 1982).

Lacy, L. L., Witherow, W. K., Facemire, B. R., and Nishioka, G. M., "Optical Studies of a Model Binary Miscibility Gap System," NASA TM-82494, June 1982.

Larson, D. J. and Pirich, R. G., "Influence of Gravity Driven Convection on the Directional Solidification of Bi/MnBi Eutectic Composites," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 523-532.

Nair, M., Fu, T-W., Wilcox, W. R., Doddi, K., and Ravishankar, R. S., "Response of MnBi-Bi Eutectic to Freezing Rate Changes," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 533-542.

Outlaw, R. A., Peterson, D. T., and Schmidt, F. A., "Hydrogen Partitioning in Pure Cast Aluminum Determined by Dynamic Evolution Rate Measurements," Met. Trans. 12A, 1809 (October 1981).

Outlaw, R. A., Peterson, D. T., and Schmidt, F. A., "Diffusion of Hydrogen in Pure Large Grain Aluminum," Scripta Met. 16, 287-292 (1982).

Perepezko, J. H., Galaup, C., and Cooper, K. P., "Solidification of Undercooled Monotectic Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 491-502.

Pirich, R. G., "Gravitationally Induced Convection During Directional Solidification of Off-Eutectic Mn-Bi Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 593-602.

Pirich, R. G., "SPAR IX Technical Report for Experiment 76-22-Directional Solidification of Magnetic Composites," Grumman, NAS8-32219, June 1982.

Potard, C., "Solidification of Hypermonotectic Al-In Alloys Under Microgravity Conditions," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 543-551.

Rathz, T. J., "Review of Microscopic Superconducting Theory and Experimental Parameters Relevant to Strong-Coupled Materials," Working Paper, February 1982.

Rathz, T. J., "Tolerance Requirements to Prevent Fluid Leakage in the Crucible/Plunger MEA Experiment MPS 770030," NASA TM-82497, August 1982.

Ravishankar, R. S., "Directional Solidification of Mn-Bi Alloys," Ph.D. Thesis, Clarkson College, 1979.

Robinson, M. B., Rathz, T. J., Evans, N. A., Hofmeister, W. H., and Bayuzick, R. J., "The Preparation of Nb-Ge and Nb-Al Alloys by Containerless Solidification in Long Drop Tubes," presented at Materials Research Society Meeting, Boston, MA, November 1-5, 1982.

Sample, A. and Hellawell, A., "The Effect of Mold Precession on Channel and Macro-Segregation in Ammonium Chloride-Water Analog Castings," Trans. Met. B 13B, 495 (September 1982).

Schaeffer, R. J. and Coriell, S. R., "Convective and Interfacial Instabilities During Solidification of Succinonitrile Containing Ethanol," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 479-490.

Shiohara, Y., Chu, M. G., MacIsaac, D., and Flemings, M. C., "Solidification Mechanism of Highly Undercooled Metal Alloys," in Materials Research Society Symposia Proceedings, Rapidly Solidified Amorphous and Crystalline Alloys, Volume 8 (B. H. Kear, W. Giessen, and M. Cohen, eds.), North Holland, 1982, in press.

Thompson, C. V. and Spaepen, F., "The Effect of Solute on the Homogeneous Crystal Nucleation Frequency in Metallic Melts," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 603-610.

Verhoeven, J. D., Noack, M. A., and Bavolo, A. J., "Suppression of Marangoni Convection with Oxide Films," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 513-522.

Fluids, Transports, and Chemical Processes

Alter, W. S., "Investigation of Surface Tension Phenomena Using the KC-135 Aircraft," submitted for publication as NASA Technical Memorandum, October 1982.

Annamalai, P., Subramanian, R. S., and Cole, R., "Bubble Motion in a Rotating Liquid Body," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 187-190.

Annamalai, P., Shankar, N., Cole, R., and Subramanian, R. S., "Bubble Migration in a Liquid Drop in a Space Laboratory," Appl. Sci. Res. 38, 179-186 (1982).

Annamalai, P., Subramanian, R. S., and Cole, R., "Bubble Migration in a Rotating Liquid-Filled Sphere," Phys. Fluids 25, 1121 (July 1982).

Bamberger, S., Seaman, G.V.F., Brown, J. A., and Brooks, D. E., "The Partition of Sodium Phosphate and Sodium Chloride in Aqueous Dextran Poly(ethylene glycol) Two Phase Systems," submitted to Journal of Colloid and Interface Science, 1982.

Bartels, P. H., Olson, G. B., Bartels, H. G., Brooks, D. E., and Seaman, G.V.F., "The Automated Analytical Electrophoresis Microscope," Cell Biophysics 3, 371-386 (1981).

Bier, M., Egen, N. B., Mosher, R. A., and Twitty, G. E., "Isoelectric Focusing in Space," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 261-266.

Bier, M., Mosher, R. A., and Palusinski, O. A., "Computer Simulation and Experimental Validation of Isoelectric Focusing in Ampholine-Free Systems," J. Chromat. 211, 313-335 (1981).

Bosisio, A. B., Loehlein, C., Snyder, R. S., and Righetti, P. G., "Titration Curves of Proteins by Combined Isoelectric Focusing-Electrophoresis in Highly Porous Polyacrylamide Matrices," J. Chromato. 189, 317-330 (1980).

Bosisio, A. B., Snyder, R. S., and Righetti, P. G., "Molecular Weight Distribution of Carrier Ampholytes for Isoelectric Focusing," J. Chromato. 209, 265-272 (1981).

Brooks, D. E., "Countercurrent Distribution of Biological Cells," Annual Progress Report, NAS8-33575, July 1982.

Brooks, D. E. and Bamberger, S., "Studies of Aqueous Two Phase Polymer Systems Useful for Partitioning of Biological Materials," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 233-240.

Campbell, C. W. and Owen, R. B., "Conceptual Development of the Laser Beam Manifold," NASA TM-78248, October 1979.

Chang, C. J. and Brown, R. A., "Finite Element Methods for Buoyancy-Driven Convection Near a Melt/Solid Phase Boundary," in Proceedings of Second National Symposium on Numerical Methods in Heat Transfer, McGraw-Hill, 1982, in press.

Chang, C. J. and Brown, R. A., "Multiple Steady Flows in a Two-Phase Rayleigh-Bernard Problem," in preparation for Int. J. Num. Meth. Fluids.

Deiber, J. A. and Saville, D. A., "Flow Structure in Continuous Flow Electrophoresis Chambers," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 217-224.

Dintenfass, L. and Jedrzejczyk, H., "Morphology and Kinetics of Aggregation of Red Cells in 12.5 Micrometer Slits: A Micro- and Macro-Photographic Study," in Hemorheology and Diseases, Proceedings of the First European Conference on Clinical Hemorheology, Nancy, France, October 1979, J.F. Stoltz and P. Drouin (eds., Paris, Doin Editors, 1980.

Douglas, C. and Roylance, D., "Finite Element Analysis of Non-Isothermal Polymer Processing Operations," MIT, Research Report R82-1, April 1982.

Douglas, C. and Roylance, D., "Chemorheology of Reactive Systems: Finite Element Analysis," ACS Symposium Series on Chemorheology of Thermosetting Polymers, September 1982.

Dressler, R. F., "Approximate Analysis of Thermal Convection in a Crystal-Growth Cell for Spacelab 3," NASA TP-2016, June 1982.

Dressler, R. F., Robertson, S. J., and Spradley, L. W., "Effect of Rayleigh Accelerations Applied to an Initially Moving Fluid," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 203-216.

Dunning, J. D. and Snyder, R. S., "Electrophoretic Separation of Lunar Solis in a Space Manufacturing Facility," presented at Fifth Princeton Industrial Conference on Space Manufacturing, Princeton, New Jersey, May 18-21, 1981.

Dunning, J. D., Herren, B. J., Tipps, R. W., and Snyder, R. S., "Fractionation of Mineral Species by Electrophoresis," Journal of Geophysical Research, in press.

El-Kaddah, N. and Szekely, J., "The Calculation of Transport Phenomena in Electromagnetically Levitated Metal Droplets," in Materials Research Society Symposia Proceedings, Materials Processing in Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 191-198.

El-Kaddah, N. and Szekely, J., "The Calculation of Transport Phenomena in Electromagnetically Levitated Metal Droplets," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 191-198.

El-Kaddah, N. and Szekely, J., "The Electromagnetic Force Field Fluid Flow Field and Temperature Profiles in Levitated Metal Drops," Met. Trans. B (1982), in press.

El-Kaddah, N. and Szekely, J., "Fluid Flow and Mass Transfer in an Inductively Stirred Four Ton Melt of Molten Steel," Met. Trans. B (1982), in press.

El-Kaddah, N. and Szekely, J., "Fluid Flow Phenomena in a Levitated Melted Sphere Under Zero Gravity," J. Appl. Phys. (1982), in press.

El-Kaddah, N. and Szekely, J., "Physical and Mathematical Modelling of Ladle Metallurgy Operation," Proceedings of International Symposium on Injection Phenomena in Extraction and Refining (University of Newcastle upon Tyne, 1982): R1-42.

El-Kaddah, N. and Szekely, J., "The Turbulent Recirculating Flow in Coreless Induction Furnace. A Comparison of Theoretical Prediction with Measurements," J. Fluid Mech. (1982), in press.

Hardy, S. C., "The Motion of Bubbles in a Vertical Temperature Gradient," J. Colloid & Interface Sci. 69, 157-162 (March 1979).

Hardy, S. C. and Fine, J., "Studies of Liquid Metal Surfaces Using Auger Spectroscopy," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 503-511.

Harriott, G. M. and Brown, R. A., "Flow in a Differentially Rotated Cylindrical Drop at Moderate Reynolds Number," submitted to Journal of Fluid Mechanics (1982).

Harriott, G. M. and Brown, R. A., "Flow in a Differentially Rotated Cylindrical Drop at Low Reynolds Number," submitted to Journal of Fluid Mechanics (1982).

Harris, J. M., Hundley, N. H., Shannon, T. G., and Struck, E. C., "Grown Ethers Attached to a Soluble Polymer," submitted to Journal of Organic Chemistry, 1982.

Herren, B. J., Tipps, R. W., and Alexander, K. D., "Microelectrophoresis of Selected Mineral Particles," NASA TM-82467, January 1982, 16 pgs.

Ivory, C. F., "Continuous Flow Electrophoresis: The Crescent Phenomena Revisited Part II: Nonisothermal Effects," Electrophoresis 2, 31-39 (1981).

Kamotani, Y., Ostrach, S., and Lowry, S., "An Experimental Study of Heat Induced Surface Tension Driven Flow," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 161-172.

Kawasaki, K. and Ohta, T., "Kinetics of Fluctuations for Systems Undergoing Phase Transitions - Interfacial Approach," presented at Conference on Nonlinear Fluid Behavior, Boulder, CO, June 7-11, 1982, Proceedings to appear in Physica A.

Kurtz, R. L., Lui, H. K., and Owen, R. B., "Holographic Systems," in A Handbook of Optical Holography, J. Caulfield, ed., Academic Press, 1979.

Levine, S., "A Theory of Electrophoresis of Emulsion Drops in Aqueous Two-Phase Polymer Systems," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, 1982.

Mosher, R. A., Palusinski, O. A., and Bier, M., "Theoretical Studies in Isoelectric Focusing," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 255-260.

Olson, G. B., McFadden, M., and Bartels, P. H., "Application of the Automated Electrophoresis Microscope System to Various Biological Tests," in Electrophoresis '81, Walter de Gruyter & Co., Berlin, 1981, pp. 933-946.

Omenyi, S. N., Snyder, R. S., Van Oss, C. J., Absolom, D. R., and Neumann, A. W., "Effects of Zero van der Waals and Zero Electrostatic Forces on Droplet Sedimentation," J. Colloid & Interface Sci. 81, 402 (June 1981).

Omenyi, S. N., Snyder, R. S., Absolom, D. R., Van Oss, C. J., and Neumann, A. W., "Enhanced Erythrocyte Suspension Layer Stability Achieved by Surface Tension Lowering Additives," J. Disp. Sci. & Techn. 3, 307-333 (1982).

Omenyi, S. N., Rhodes, P. H., and Snyder, R. S., "Stability of Erythrocyte Suspensions Layered on Stationary and Flowing Liquids," Sep. Sci. Techn. 17, 849-857 (1982).

Ostrach, S., "Low-Gravity Fluid Flows," Ann. Rev. Fluid Mech. 14, 313-345 (1982).

Owen, R. B. and Campbell, C. W., "A Laser Beam Manifold and Particle Photographic System for Use in Fluid Velocity Measurements," Rev. Sci. Instrum. 51, 1504 (1980).

Owen, R. B., "Interferometry and Holography in a Low-Gravity Environment," Applied Optics 21, 1349-1355 (April 1982).

Owen, R. B., "Optical Systems Utilized in Low-Gravity Materials Processing Experiments," JASA 71, 1566 (1981). Abstract

Owen, R. B. and Johnston, M. H., "Laser Shadowgraph and Schlieren Studies of Gravity-Related Flow During Solidification," Opt. Laser Engr. 2, 129-146 (1981).

Owen, R. B., "Interferometric Measurements of Unidirectional Solidification in Microgravity," presented at OSA 1982 Meeting, abstract to be published in JASA.

Rembaum, A. and Dreyer, W. J., "Immunomicrospheres: Reagents for Cell Labeling and Separation," Science 208, 364-368 (April 1980).

Rhodes, P. H. and Snyder, R. S., "The Effect of Small Temperature Gradients on Flow in a Continuous Flow Electrophoresis Chamber," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 225-232.

Rhodes, P. H. and Snyder, R. S., "Improved Electrophoresis Cell," NASA Tech Briefs, Summer 1981.

Righetti, P. G., Brost, B.C.W., and Snyder, R. S., "On the Limiting Pore Size of Hydrophilic Gels for Electrophoresis and Isoelectric Focusing," J. Biochem & Biophys. Meth. 4, 347-363 (1981).

Riley, C. and Coble, H. D., "Electrodeposition in Microgravity," NAS8-33812, Final Report, June 1982.

Riley, C., Coble, H. D., and Owen, R. B., "Cu and Co Electrodeposition Studies in Low Gravity ($-10\mu g$) Relative to Earth ($1g$)," presented at Thirty-Fourth Southeast Regional Meeting, American Chemical Society, Birmingham, Alabama, November 3-5, 1982. Abstract

Robertson, S. J. and Spradley, L. W., "Numerical Simulation of Natural Convection in a Spherical Container Due to Cooling at the Center (Idealization of the Lal/Kroes Experiment)," NASW-3281, LMSC-HREC TR D784100, February 1981.

Rosenberger, F., "Mass Transfer in Closed Ampoule Vapor Crystal Growth," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 199-202.

Roylance, D. K., "Finite Element Modeling of Nonisothermal Polymer Flows," MIT, Research Report R81-3, August 14, 1981.

Roylance, D. K., "Use of 'Penalty' Finite Element in Analysis of Polymer Melting Processing," Polymer Engr. & Sci. 20, 1029-1034 (October 1980).

Savage, J., "Preparation of Guinea Pig Macrophages for Electrophoretic Experiments in Space," NASA CR-158777, Final Report, 1979, 43 pgs.

Schmid, L. A., "Radiometric Calorimetry for Radiative Cooling of a Sphere," submitted to Journal of Research of the National Bureau of Standards, 1982.

Sen, S. K., Smith, M. K., Davis, S. H., and Homsy, G. M., "Steady Thermocapillary Flows and Their Stability," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 173-176.

Sen, A. K. and Davis, S. H., "Steady Thermocapillary Flows in Two-Dimensional Slots," J. Fluid Mech. 121, 163 (1982).

Shankar, N., Cole, R., and Subramanian, R. S., "Thermocapillary Motion of Bubbles Inside Drops," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 249-254.

Shankar, N. and Subramanian, R. S., "The Slow Axisymmetric Migration of a Gas Bubble Eccentrically Placed Inside a Drop in a Space Laboratory," submitted, 1982.

Sloyer, J. L., McGuire, J. K., and Snyder, R. S., "Electrokinetic Separation of Pneumococcal Polysaccharides: Potential for Increased Immunogenicity," Proceedings of the Federation of American Societies for Experimental Biology 40, 3 (March 1981).

Smith, M. K. and Davis, S. H., "The Instabilities of Thermocapillary Shear Layers," NAS8-33881, Technical Report No. 8116, August 1982.

Smith, M. K. and Davis, S. H., "The Instability of Sheared Liquid Layers," J. Fluid Mech. 121, 187 (1982).

Spradley, L. W. and Stalnaker, J. F., "A Quasi-Parabolic Technique for Computation of Three-Dimensional Viscous Flows," 19th Aerospace Sciences Meeting, St. Louis, Missouri, January 12-15, 1981, AIAA Paper 81-0113.

Trinh, E. and Wang, T. G., "Large-Amplitude Free and Driven Drop-Shape Oscillations: Experimental Observations," J. Fluid Mech. 122, 315 (1982).

Ungar, L. H. and Brown, R. A., "The Dependence of the Shape and Stability of Captive Rotating Drops on Multiple Parameters," Phil. Trans. R. Soc. Lond. (1982), in press.

Vanderhoff, J. W., "Preparation of Large-Particle-Size Monodisperse Latexes," to be published in Proceedings of 'Space 2000', 33rd International Astronautical Congress, Paris, France, September 27-October 2, 1982.

Vanderhoff, J. W., "Preparation of Large-Particle-Size Monodisperse Latexes," submitted to Science, 1982.

Witherow, W. K., "Holographic Microscopy Studies of Emulsions," M.S. Thesis, University of Alabama in Huntsville, 1981.

Witherow, W. K., "Holographic Microscopy Studies of Emulsions," NASA TM-82437, August 1981.

Xu, J. J. and Davis, S. H., "Liquid Bridges with Thermocapillarity," Technical Report No. 8115, NAS8-33881, August 1982.

Yamaguchi, Y., Chang, C. J., and Brown, R. A., "Multiple Buoyancy-Driven Flows in a Vertical Cylinder Heated from Below," submitted to Proc. R. Soc. Lond. (1982).

Zak, M. and Weinberg, M. C., "Gas Diffusion in Multibubble Systems," Chem. Engr. Sci. 35, 1749 (1980).

Glasses, Ceramics, and Refractories

Doremus, R. H., "Nucleation Theory: Is Replacement Free Energy Need?" in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 315-320.

McNeil, T. J., Cole, R., and Subramanian, R. S., "Surface Tension Driven Flow in Glass Melts and Model Fluids," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 289-299.

Meyyappan, M., Subramanian, R. S., Wilcox, W. R., and Smith, H., "Bubble Behavior in Molten Glass in a Temperature Gradient," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 311-314.

Mukherjee, S. P., "Gels and Gel-Derived Glasses in the $\text{Na}_2\text{O}-\text{B}_2\text{O}_3-\text{SiO}_2$ System," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 321-331.

Mukherjee, S. P., Debsikdar, J. C., and Beam, T. L., "Ultrapure Glass Optical Waveguide Development in Microgravity by the Sol-Gel Process," JPL, Final Report, January 15, 1982.

Neilson, G. F. and Weinberg, M. C., "Anomalous Phase Separation Behavior of Gel-Derived Soda Silica Glasses," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), 1982, pp. 333-341.

Nolen, R. L., Downs, R. L., and Ebner, M. A., "Glass Shell Manufacturing in Space," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 343-352.

Smith, H. D., Mattox, D. M., Wilcox, W. R., Subramanian, R. S., and Meyyappan, M., "Experimental Observation of the Thermocapillary Driven Motion of Bubbles in a Molten Glass Under Low Gravity Conditions," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 279-288.

Subramanian, R. S., Cole, R., Annamalai, P., Jayaraj, K., Kondos, P., McNeil, T. J., and Shankar, N., "Physical Phenomena in Containerless Glass Processing," NASA CR-162007, Annual Technical Report, January 1982.

Turnbull, D., "Crystal Nucleation in Glass-Forming Alloy and Pure Metal Melts under Containerless and Vibrationless Conditions," Annual Report, NAS8-32691, July 1982.

Uhlmann, D. R., "Glass Processing in a Microgravity Environment," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 269-278.

Weinberg, M. C., "Preliminary Study of the Effects of a Reversible Chemical Reaction on Gas Bubble Dissolution," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 301-310.

Weinberg, M. C., "Surface Tension Effects in Gas Bubble Dissolution and Growth," Chem. Engr. Sci. 36, 137-141 (1981).

Weinberg, M. C., "Dissolution of a Stationary Bubble in a Glassmelt With a Reversible Chemical Reaction. I. Rapid Forward Reaction Rate Constant," submitted to Journal of American Ceramic Society, 1982.

Weinberg, M. C. and Neilson, G. F., "Elevation of Liquidus Temperature in a Gel-derived $\text{Na}_2\text{O-SiO}_2$ Glass," submitted to Journal of American Ceramic Society, 1982.

Weinberg, M. C. and Shahi, K., "Ionic Conduction in KBr-KI Mixed Crystals," submitted to Journal of Physics and Chemistry, December 1981.

Weinberg, M. C. and Shahi, K., "The Effect of Homovalent Ions Substitution on Conductivity of Solid Solutions," presented at Electrical Chemical Society Meeting, Montreal, Canada, May 11, 1982.

Weinberg, M. C. and Shahi, K., "On the Effect of Homovalent Substitution on Phase Transformations and Conductivity on Ionic Solid Solutions," submitted to Second International Conference on Transport of Non-stoichiometric Compounds, Perpignan-Alenya, France, June 28-July 2, 1982.

Weinberg, M. C. and Shahi, K., "Enhanced Electrical Transport in Multi-phase Systems," Solid State Ionics 3-4, 295-299 (1981).

Zak, M. and Weinberg, M. C., "Multibubble Dissolution in Glass Melts," J. Non-Cryst. Solids 38-39, 533-538 (1980).

Containerless Measurement and Processing Technologies

Barmatz, M., "Overview of Containerless Processing Technologies," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 25-38.

Berge, L. H., Oran, W. A., and Theiss, J. M., "Levigator for Containerless Processing," NASA Tech Briefs, Spring 1981, p. 105.

Cezairliyan, A., "A Dynamic Technique for Measurements of Thermo-physical Properties at High Temperatures," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 49-58.

Chang, C. W., Das, D. K., Frost, R. T., and Kumar, K., "Electromagnetic Containerless Reaction of Samarium with Cobalt for the Formation of Samarium-Cobalt Alloys," Met. Trans. A **13A**, 1868 (October 1982).

Das, D., Kumar, K., Frost, R. T., and Chang, C. W., "Ultimate Intrinsic Coercivity Samarium-Cobalt Magnet, An Earth-Based Feasibility Study for Space Shuttle Missions," NAS8-33607, Final Report, June 1982.

Drehman, A. J. and Turnbull, D., "Crystal Nucleation of Pd-Si Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 81-86.

Drehman, A. J. and Turnbull, D., "Solidification Behavior of Undercooled $\text{Pd}_{88}\text{Si}_{17}$ and $\text{Pd}_{82}\text{Si}_{18}$ Liquid Droplets," Scripta Met. **15**, 543-548 (1981).

Ethridge, E. C. and Dunn, S. L., "Air Jet Levitation Furnace System for Observing Glass Microspheres During Heating and Melting," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 121-130.

Feng, I. and Lee, M. C., "Measurement of Vibrational Relaxation Time of Oxygen Between 475° and 675°K Using an Acoustic Resonant Technique," J. Acoust. Soc. Am. **71**, 1482-1486 (June 1982).

Frost, R. T. and Chang, C. W., "Theory and Applications of Electromagnetic Levitation," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 71-80.

Kendall, J. M., Lee, M. C., and Wang, T. G., "Metal Shell Technology Based Upon Hollow Jet Instability," J. Vac. Sci. Techn. 20, 1091-1093 (April 1982).

Lacy, L. L., Robinson, M. B., Rathz, T. J., Evans, N. D., and Bayuzick, R. J., "Solidification Studies of Nb-Ge Alloys at Large Degrees of Supercooling," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 87-94.

Lacy, L. L., Rathz, T. J., and Robinson, M. B., "Containerless Undercooling and Solidification of Bulk Metastable Nb₃Ge Alloys," J. Appl. Phys. 53, 682 (January 1982).

Lee, M. C., Kendall, J. M., and Johnson, W. L., "Spheres of the Metallic Glass Au₅₅Pb_{22.5}Sb_{22.5} and their Surface Characteristics," Appl. Phys. Lett. 40, 383-384 (March 1982).

Lee, M. C., Kendall, J. M., Elleman, D. D., Rhim, W. K., Helizon, R. S., Youngberg, C. J., Feng, I., and Wang, T. G., "Application of Microgravity and Containerless Environments to the Investigation of Fusion Target Fabrication Technology," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 95-104.

Lee, M. C., Kendall, J. M., and Wang, T. G., "Investigation of Metallic and Metallic Glass Hollow Spheres for Fusion Target Application," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 105-114.

Lee, M. C. and Feng, I., "Acoustic Levitating Apparatus for Submillimeter Samples," Rev. Sci. Instrum. 53, 854-859 (June 1982).

Lee, M. C., Feng, I., Elleman, D. D., and Wang, T. G., "Summary Abstract: Coating of Glass Microballoons Using an Acoustic Technique," J. Vac. Sci. Techn. 20, 1123-1124 (April 1982).

Margrave, J. L., "Heat Capacities of Liquid Metals above 1500K," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 39-42.

Nordine, P. C., Schiffman, R. A., and Sethi, D. S., "Atomic Fluorescence Study of High Temperature Aerodynamic Levitation," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 43-48.

Nordine, P. C. and Atkins, R. M., "Aerodynamic Levitation of Laser-Heated Solids in Gas Jets," Rev. Sci. Instrum. 53, 1456 (September 1982).

Oran, W. A. and Berge, L. H., "Containerless Melting and Solidification of Materials with an Aerodynamic Levitation System," Rev. Sci. Instrum. 53, 851-853 (June 1982).

Racette, G. W. and Frost, R. T., "Deposition of Polycrystalline Silicon-Films on Metal Substrates Under Ultra-High Vacuum," J. Cryst. Growth 47, 384-388 (1979).

Rhim, W-K., Saffren, M. M., and Elleman, D. D., "Development of Electrostatic Levitator at JPL," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 115-120.

Rush, J. E., Stephens, W. K., and Ethridge, E. C., "Properties of a Constricted-Tube Air-Flow Levitator," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 131-136.

Szekely, J., El-Kaddah, N., and McKelliget, J., "Mathematical Modelling of Plasma Spraying Processes," Proceedings of International Conference on Vacuum Metallurgy, Tokyo, Japan, 1982.

Szekely, J., Abbaschian, G., El-Kaddah, N., and Wang, C. A., "Role of Convection in Grain Refining," Minutes of Containerless Processing Task Team Meeting, G.E. Space Center, King of Prussia, PA, October 27-28, 1980, p. 22.

Young, A. T., Lee, M. C., Feng, I., Elleman, D. D., and Wang, T. G., "Polymer Coating of Glass Microballoons Levitated in a Focused Acoustic Field," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 67-70.

Experimental Facilities

Shurney, R. E. (ed)., "The Marshall Space Flight Center KC-135 Zero Gravity Test Program for FY1981," NASA TM-82476, March 1982.

General Surveys and Studies

Chenault, A., "Diabetes," in McGraw-Hill Encyclopedia of Science and Technology, 5th Edition, McGraw-Hill, Inc., New York, 1982, pp. 153-156.

Craven, P. D. (ed), "Spacelab Mission I - Experiment Descriptions, Second Edition, ESA FSLP-EX-001, November 1981.

Naumann, R. J., "Scientific Results from the Materials Processing in Space Program," to be published in Advances in Ceramics, 1982.

Rindone, G. E. (ed), Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9, New York, North Holland Press, 1982.

Steurer, W. H., "Extraterrestrial Materials Processing, JPL Publication 82-41, April 15, 1982.

Wilcox, W. R., "Manufacturing in Space," The Christian Science Monitor, March 31, 1982.

Combustion

Azarbarzian, A., "The Observation of Lean Limit Extinction Using an Image Intensifier," MS Thesis, The University of Illinois, 1980.

Berlad, A. L., "Gravitational Effects on Combustion," Prog. Astro. & Aeron. 52, 89-110 (1977).

Berlad, A. L., "Fluid and Combustion Dynamics," in Applications of Space Flight in Materials Science and Technology, NBS Special Publication 520, 1978.

Berlad, A. L., "Combustion Experiments in Space," in Spacecraft Dynamics as Related to Laboratory Experiments in Space, edited by G. H. Fichtl, B. N. Antar, and F. G. Collins, NASA CP-2199, 1981, pp. 37-42.

Berlad, A. L. and Lavid, M., "Gravitational Effects in Chemical Reacting Boundary Layer Flows Over a Horizontal Flat Plane," presented at 16th International Symposium on Combustion; published by the Combustion Institute, 1977, p. 1557.

Berlad, A. L. and Killroy, J., "Flame Propagation and Extinction for Clouds of Particles," Combustion Institute, Spring Technical Meeting, Cleveland, Ohio, March 28-30, 1977.

Berlad, A. L. and Killroy, J., "Combustion of Porous Solids at Reduced Gravitational Conditions," NASA CR-3197, October 1979.

Berlad, A. L. and Krishna, K. R., "Gravitational Effects on Auto Ignition of Particle Clouds," presented at Meeting of the Eastern States Section of the Combustion Institute, November 1975.

Berlad, A. L., Wang, L. S., Joshi, N., and Pai, C. I., "Combustion at Reduced Gravitational Conditions," NASA CR-163812, 1981.

DeWitt, R., "Requirements and Preliminary Concept of a Zero-Gravity Combustion Facility for Spacelab," 19th Aerospace Sciences Meeting, St. Louis, Missouri, January 12-15, 1981, AIAA Paper 81-0165.

Drake, M. C. and Hastie, J. W., "Temperature Profile of Inhibited Flames Using Raman Spectroscopy," Combustion and Flame 40, 201-213 (February 1981).

Kanury, A. and Murty, A., "Feasibility Study of Liquid Pool Burning in Reduced Gravity," NASA CR-159642.

Knight, B. A., "Combustion of Hydrocarbon Droplets in the Absence of Buoyancy," MS Thesis, University of California, 1977.

Knight, B. A. and Williams, F. A., "Observations of the Burning of Droplets in the Absence of Buoyancy," Combustion and Flame 38, 111-119 (1980).

Knight, B. A. and Williams, F. A., "Observations on the Burning of Droplets in the Absence of Buoyancy," Combustion Institute, Spring Technical Meeting, Cleveland, Ohio, March 28-30, 1977.

Krishna, K. R. and Berlad, A. L., "A Model for Dust Cloud Auto-ignition," Combustion and Flame 37, 207 (1980).

Reuss, D. L., "Effect of Gravity on Lean Limit Flame Propagation," Ph.D. Thesis, University of Illinois, 1979.

Reuss, D. L., "Lean Limit Flame Propagation in Methane-Air Mixtures Under Zero Gravity Conditions," submitted to Astron. and Aeron., Volume 73.

Sommerfield, M., Messina, N. A., and Ingram, L. S., "Definition of Smoldering Experiment for Spacelab, NASA CR-159528.

Spuckler, C. M., "Combustion of Solid Rods in Zero and Normal Gravity," Ph.D. Thesis, University Toledo, 1981.

Spuckler, C. M., et al., "Combustion of Solid Carbon Rods in Zero and Normal Gravity," NASA TM-79303, 1979 or 1980.

Strehlow, R. A. and Reuss, D. L., "Effect of Zero-G Environment on Flammability Limits as Determined Using a Standard Flammability Tube Apparatus," NASA CR-3259.

Williams, F. A., "Droplet Burning at Zero-G," NASA CR-158160, Final Report, 1979, 193 pgs.

B. EUROPEAN PROGRAM

PRECEDING PAGE BLANK NOT FILMED

Crystal Growth

Hamar, R. and Lemaignan, C., "Facetting Behaviour of Al_2Cu During Solidification," J. Cryst. Growth **53**, 586 (1981).

Langbein, D., "Theoretische Untersuchungen zur Entmischung nicht mischbarer Legierungen," Bundesministerium für Forschung und Technologie, Forschungsbericht W 81-004, Luft- und Raumfahrt, Weltraumforschung/Weltraumtechnologie Battelle-Institut e.V. Frankfurt am Main, February 1981.

Lemaignan, C., "Initial Stages of Eutectic Solidification," Acta Met. **29**, 1379 (1981).

Lemaignan, C. and Pelissier, J., "Observation par microscopie électronique in situ de la solidification d'alliages eutectiques," in Materials Research Society Proceedings, Conference on In-Situ Composites IV, Volume 8 (B. H. Kear, B. C. Giessen, and M. Cohen, eds.), North Holland Press, 1982.

Lemaignan, C., Camel, D., and Pelissier, J., "Interet de la microscopie électronique in situ pour l'étude des phénomènes de solidification dans les métaux et alliages," Mémoires et Études Scientifiques Revue de Metallurgie (December 1981), pp. 663-668.

Lemaignan, C., Cheynet, M. C., and Eustathopoulos, N., "Nucleation Behaviour of Silver-Germanium Eutectic Alloys," J. Cryst. Growth **50**, 720 (1980).

Lemaignan, C., Camel, D., and Pelissier, J., "In-Situ Electron Microscopy of Some Solidification Processes in Metallic Alloys," J. Cryst. Growth **52**, 67 (1981).

PRECEDING PAGE BLANK NOT FILMED

Metals, Alloys, and Composites

Bergman, A. and Fredriksson, H., "A Study of the Coalescence Process Inside the Miscibility Gap in Zn-Bi Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 563-578.

Bergman, A., Carlberg, T., Fredriksson, H., and Stjerndahl, J., "The Influence of Gravity on the Solidification of Monotectic and Near Monotectic Cu-Pb Alloys," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 579-592.

Favier, J. J., "Striations of Kinetic Origin Induced During Non-Steady State Solidification," J. Electrochem. Soc. 129, 2355 (October 1982).

Favier, J. J., "Transient Growth Effects During Space Solidification in a Bridgman Configuration," Adv. Space Res. 1 (5), 133-155 (1981).

Fredriksson, H., "The Effect of the Natural Convection of the Transition from Columnar to Equiaxed Crystal," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 619-628.

Freiler, K., Stickler, R., and Siegfried, E., "Brazing Under Microgravity in a Resistance Heated Furnace," in Materials Research Society Symposia Proceedings, Materials Processing in the Reduced Gravity Environment of Space, Volume 9 (G. E. Rindone, ed.), North Holland, 1982, pp. 639-650.

Fluids, Transports, and Chemical Processes

Bewersdorff, A., "Long-Range Transport by Chemical Waves," Adv. Space Res. 1(5), 69-72 (1981).

Chun, Ch-H. and Wuest, W., "Correlation of Oscillations of Flow and Temperature in Floating Zone Under Microgravity," Adv. Space Res. 1(5), 17-20 (1981).

Sahn, P. R. and Tensi, H. M., "Mass Transport in the Near Vicinity of Solidification Fronts Under Conditions of Microgravity," Adv. Space Res. 1(5), 97-110 (1981).

Sarma, G.S.R., "Marangoni Convection in a Liquid Layer Under the Simultaneous Action of a Transverse Magnetic Field and Rotation," Adv. Space Res. 1(5), 55-58 (1981).

Sarma, G.S.R., "Benard-Marangoni Instability in a Rotating Liquid Layer Subjected to a Transverse Magnetic Field," presented at COSPAR/IUTAM Symposium 9, May 25-28, 1982, Ottawa, Canada, Paper 9.2.4.

Schwabe, D. and Scharmann, A., "The Magnitude of Thermocapillary Convection in Larger Melt Volumes," Adv. Space Res. 1(5), 13-16 (1981).

Siekmann, J., Scheideler, W., and Tietze, P., "Analytical and Computational Studies of Capillary Free Surfaces," Adv. Space Res. 1(5), 41-44 (1981).

Wuest, W. and Strunck, V., "Mass and Heat Exchange in Liquids Enclosed in Containing Walls at Zero Gravity," Adv. Space Res. 1(5), 87-90 (1981).

General Studies and Surveys

Clancy, P. F. and Kingdon, J., "Technological Research and Development Activities of ESA in the Instrumentation for Material Science and Fluid Physics Experiments in Microgravity," Adv. Space Res. 1(5), 91-94 (1981).

Huth, U., "The Materials-Science Element of the First Spacelab Payload (FSLP)," ESA Bulletin No. 31, 34-45 (August 1982).

Malmejac, Y., "European Present and Future Scientific Activities in the Field of Low Gravity Research," Adv. Space Res. 1(5), 61-64 (1981).

C. SOVIET PROGRAM

Crystal Growth

Aladiev, S. I. and Okhotin, A. S., "Rate of Crystal Growth from the Vapor-Gas Medium at High and Low Rayleigh Numbers," Adv. Space Res. 1(5), 45-49 (1981).

Bagraev, N. T., Vlasenko, L. S., Ignatjev, G. E., Okhotin, A. S., and Shcherbakov, V. A., "Investigations of Nuclear Magnetic Resonance of Te-Se Solid Solutions," Adv. Space Res. 1(5), 125-128 (1981).

Barta, G., Trnka, J., Triska, A., and Frumar, M., "Recrystallization of Glasses of the Ge-Sb-S System Prepared under Zero Gravity Conditions," Adv. Space Res. 1(5), 121-124 (1981).

Borovikova, R. P., Ignatjev, G. E., Okhotin, A. S., and Shcherbina-Samoilova, M. B., "Investigation of Electro-physical Properties of Te-Se Solid Solutions Obtained in Various Conditions," Adv. Space Res. 1(5), 157-161 (1981).

Herrmann, R., Rudolph, P., Kruger, H., Schneider, G., Rostel, R., Kuhl, R., Okhotin, A. A., Khryapov, V. T., Markov, E. V., and Kazakov, I. P., "First Results of the Growing of Pb-Te Single Crystals Under Microgravity Conditions," Adv. Space Res. 1(5), 163-166 (1981).

Nikitin, S. A., Polozhayev, V. I., and Fedysuhkin, A. I., "Mathematical Simulation of Impurity Distribution in Space Processing Experiments with Semiconductors," Adv. Space Res. 1(5), 37-40 (1981).

Stastna, J., Vodak, F., Barta, G., and Triska, A., "Effect of Gravity on the Velocity of a Crystallization Front," Adv. Space Res. 1(5), 167-169 (1981).

Zemskov, V. S., Belokurova, I. N., Titkov, A. N., and Shulpina, I. L., "Solidification of Ge-Si Solid Solutions in Near-Zero-G Conditions," Adv. Space Res. 1(5), 129-132 (1981).

PRECEDING PAGE BLANK NOT FILMED

Metals, Alloys, and Composites

Lukac, P., Menovsky, A., Trojanova, Z., and Krumpos, J., "The Influence of Microgravity on the Growth of Metals and Alloys-The Project of Czechoslovak Experiment," Adv. Space Res. 1(5), 73-76 (1981).

Fluids, Transports, and Chemical Processes

Barta, G. and Hajosy, A., "Movement of Material Point in the Gravity Field of a Homogeneous Ring," Adv. Space Res. 1(5), 77-85 (1981).

Chvoj, Z. and Demo, P., "The Basic Thermodynamical Equations of Surface Phases," Adv. Space Res. 1(5), 21-24 (1981).

Oppermann, H. and Okhotin, A. S., "About the Influence of Convection on the Transport of Chemical Transport," Adv. Space Res. 1(5), 51-54 (1981).

General Studies and Surveys

Barta, C., Trnka, J., and Triska, A., "Some Czechoslovak Experiment .
Selected in the Field of Materials Research under Zero Gravity
Conditions," Adv. Space Res. 1(5), 65-68 (1981).

Fischer, H. J., Herrmann, R., Hilbert, K., Kuhl, R., and
Ochotin, A. S., "First Results of Experiments on Materials Sciences On
Board of Salyut-6 Orbital Complex During the Joint Manned Flight USSR
and GDR," XXX IAF Congress, Munich, Germany, September 16-22, 1979,
Preprint 79-135.

Fischer, H. J., Kuhl, R., Oppermann, H., Herrmann, R., Hilbert, K.,
Okhotin, A. S., Ignatjev, G. E., Khryapov, V. T., Markov, E. M., and
Barmin, I. V., "Experiment 'Berolina' Using Microgravity Conditions on
Board the Salyut-6 Space Station for Research in Material Science,"
Adv. Space Res. 1(5), 111-115 (1981).

II. PATENTS

Patents

Fripp, A. L. , Robertson, J. B., and Breckenridge, R. A.,
"Pyroelectric Detector Arrays," U.S. Patent #4,341,012, 1982.

Naumann, R. J. and Ethridge, E. C., "Containerless Processing of
Optical Glass Fibers," patent pending, 1982.

Rhodes, P. H. and Snyder, R. S., "Electrophoresis Device," U.S. Patent
4,349,249, September 14, 1982.

Wang, T. G. and Elleman, D. D., "System for Producing Gas-Filled
Hollow Spheres," U.S. Patent #4,344,787, 1982.

PRECEDING PAGE BLANK NOT FILMED

APPENDIX A

**REPORTS AND MISCELLANEOUS COLLECTED PAPERS
(NO AUTHOR STATED)**

PRECEDING PAGE BLANK NOT FILMED

The Tailoring of Metals, Battelle Research Outlook, Volume 2, 1970, 40 pgs.

Technical Support Package for Tech Brief LAR-12131, "Nuclear-Pumped Gas Lasers," Spring 1977.

"Design, Construction, Test, and Field Support of a Containerless Payload Package for Rocket Flight," GE, Final Report, May 20, 1977, NAS8-30797.

Symposium on Capillarity and Wettability, edited translation and German original, June 1977, 76 pgs.

"The Shuttle Opens the Space Frontier to U.S. Industry," Business Week, August 22, 1977, pp. 1-4.

"Workshop on GaAs," held November 14-18, 1977, Wakefield, MA.

Space Industrialization, Executive Summary, Final Report, Rockwell, 1978, Volumes I-V.

Fourth American Conference on Crystal Growth, Abstracts and Conference Program, NBS, Gaithersburg, MD, July 16-19, 1978.

Acoustic Containerless Processing Module, Phase B Study, Volume I, Technical Final Report, JPL, January 31, 1979.

Conference on Inertial Confinement Fusion, February 26-28, 1980, San Diego, California, Technical Digest.

"Analysis and Calculation of Macroseggregation in a Casting Ingot, Volume I: Formulation and Analysis," General Electric, NAS8-33573, Final Report, July 1980.

"Processing in Space Could Create a Whole New World of Materials," Mat. Engr., October 1980, pp. 35-53.

Research and Technology Annual Report, 1981, 73 pgs.

Materials Processing in Space (MPS) Program Description, NASA TM-82410, April 1981.

Materials and Processing Symposium: Experiment Space Scientist Congress, Tokyo, Japan, June 23-24, 1981.

"How NASA Helped Industry," The Wall Street Journal, August 28, 1981.

"NASA, Two Firms Plan to Create Exotic Drugs in First 'Space Factory'," The Wall Street Journal, September 23, 1981.

Advanced MEA Study A Conceptual Design and Analysis Study, Program Development, October 1981, 137 pgs.

PRECEDING PAGE BLANK NOT FILMED

"NASA Promotes the Idea of Making Exotic Goods in the Space Shuttle, But Idea Is Slow to Take Off," The Wall Street Journal, October 22, 1981, p. 56.

"The Critical Interval," Technology 1, November/December 1981.

"NASA at the Crossroads: What Went Wrong," Boston Globe, November 12, 1981.

Monodisperse Latex Reactor (MLR) A Materials Processing Space Shuttle Mid-Deck Payload, December 1981.

"Si Growth to be Tried in Space," Electronic News, January 18, 1982.

"Casting a Novel Industry/NASA Bond," Astron. & Aeron., February 1982.

Proceedings of the Second International Colloquium on Drops and Bubbles, Monterey, CA, November 19-21, 1981, JPL Publication 82-7, published March 1982.

Feasibility Analyses of Electroepitaxial R&D Accommodations," Summary Report, Volume I, Brown Teledyne, April 1982.

COSPAR/IUTAM 9, Symposium on Fundamental Aspects of Materials Sciences in Space, Ottawa, Canada, May 25-28, 1982, Sessions.

Materials Processing in Space Apparatus for Solidification and Crystal Growth Studies, Mephisto Project, Preliminary, August 1982.

Draft Report of the Panel on Materials Science and Engineering in Space to the Space Applications Board, Crestwood Study, August 20, 1982.

NASA/MPS Program, Solidification Working Group Meeting, Washington, D.C., August 24-26, 1982.

Applications and Technology Spacelab Payloads, Project Management Report to Office of Space Science and Applications, Part, Technical, September 1982.

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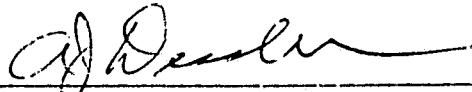
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